

We are learning to use estimation to check the answers in decimal multiplication and division problems.



A calculator.

Activity



- 1 Esther got $36.897 \div 0.987 = 36.417339$ on her calculator. Is she correct?

Yes because the estimate would be $37 \div 1 = 37$ and her answer is quite close to 37.



No because she is dividing by a number smaller than 1 so the answer must be bigger than 36.897.



Who is correct? Explain.

2



Rebecca earns \$8.50 each week doing her paper run. She worked out that over 6 weeks she would earn \$45.50.

How can you tell she is wrong without doing the calculation?

- 3 Sam knew that these bills were wrong without doing the calculations. Explain how he knew.

a

Skirt	\$102.40
Cardigan	\$147.90
3 Scarves @	\$10.20
Total	\$295.30

b

6 Rugby Jerseys	
@ \$44.78	
Total	\$286.68

c

4 kg Mince @ \$6.10/kg	
2 kg Apricots @ \$2.85/kg	
Total	\$25.10

- 4 Ashmita had six lengths of ply wood to make a model of her house. Each piece was 0.72m long. She needed 4 m for her model. Estimate if she had enough wood.



5 Use estimation to show that each of these is wrong.

- a $\$3.90 \times 5 = \15.45 b $\$5.90 \times 4 = \20.90 c $\$36.30 \div 4 = \7.90
 d $\$6.80 \times 7 = \49.60 e $\$73.90 \div 6 = \11.20 f $\$475.50 \div 9 = \48.90

6 Who has given the best approximation for these? Justify your answer.

	Calculation	Anushka	Mere	Aidan
a	7.3×4.9	8×5	7×4	7×5
b	8.7×3.12	9×3	8×4	9×4
c	124.8×0.09	125×0	124×1	125×0.1
d	$48.7 \div 7.91$	$49 \div 7$	$48 \div 8$	$50 \div 8$
e	$345.95 \div 5.503$	$360 \div 6$	$350 \div 5$	$340 \div 5$
f	$3.36 \times 4.81 \div 1.98$	$3 \times 4 \div 2$	$4 \times 4 \div 2$	$3 \times 5 \div 2$



7 Choose the best approximate answer, **A, B, C or D**, for each of these. Would the exact answer be more or less than the estimated answer?

- | | | | | | |
|---|--------------------------------------|---------------|-----------------|---------------|---------------|
| a | 11.06×0.39 | A 44 | B 440 | C 4.4 | D 4400 |
| b | 1785×0.47 | A 9 | B 900 | C 0.09 | D 90 |
| c | $53.98 \times 0.798 \div 0.528$ | A 8 | B 80 | C 800 | D 0.8 |
| d | 0.68×0.0097 | A 0.07 | B 0.007 | C 0.7 | D 7 |
| e | $804.987 \div (0.079 \times 51.987)$ | A 2 | B 20 | C 200 | D 2000 |
| f | $\frac{2.9 \times 405}{3.1}$ | A 400 | B 40 000 | C 40 | D 4000 |

8 Glyn had 0.89 m of rope. He estimated that if he cut it in half he would either have 0.045 m, 0.45 m, or 4.5 m of rope. Which should he choose as the correct estimate?



9 Debra had \$48.70 in her purse. Estimate how many \$7.90 tickets she can buy with this.

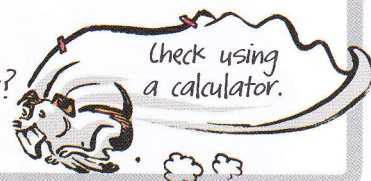
10 Using decimals in all calculations **and** at least two of the operations $+$, $-$, \times , \div in each calculation, write down five calculations that could have an estimated answer of 15.



9 Challenge

Discuss the answer to these.

- a Is $8 \div 2$ or $9 \div 2$ a better estimate for $8.59 \div 2.37$? Why?
 b Is 5×4 or 5×5 a better estimate for 4.5×4.5 ? Why?

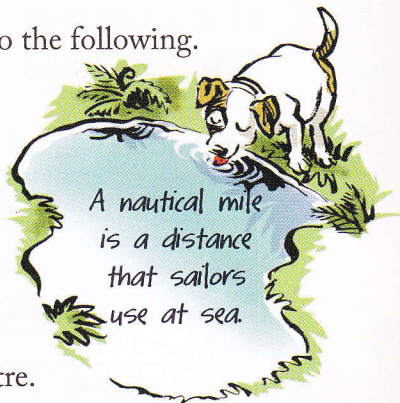


Estimating answers

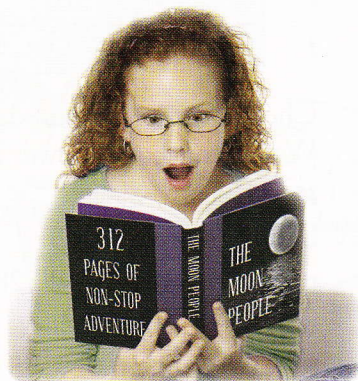


Estimate, then use your calculator, to find the answers to the following.
If rounding is required, round your answer sensibly.

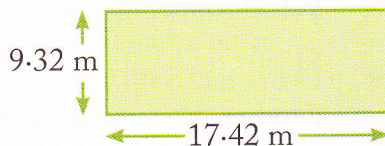
- 1 A nautical mile is about 1.853 km.
How many kilometres are in 214 nautical miles?
- 2 An ounce is about 28.35 grams.
How many ounces are there in 600 grams?
- 3 Find the cost of 9.7 m of material at \$8.20 per metre.



- 4 Karema is reading *The Moon People*.
She takes an average of 2 minutes and 5 seconds to read a page.
How many hours will it take her to read the whole book?
- 5 Amanda visited some relatives in England.
She bought a bag costing £55.89
(£ stands for British pounds).
The exchange rate at the time was
NZ\$1 = £0.3796.
The shop converted the cost to NZ\$ and told her it was \$125.89.
Did the shop tell Amanda the correct amount? Justify your answer.



- 6 The instructions on a bag of grass seed said to spread the seed at the rate of 30 g per square metre.
Jack estimated that a 5 kg bag of seed was enough for this back lawn.
Is he correct? Justify your answer.



- 7 Francie's family has just bought a new fuel-efficient car that uses 0.8674 litres of diesel per 10 km.



- a On their holiday they travel from Nelson to Milford Sound, a distance of 1146 km. How much diesel will their new car use on the journey?
- b How much less diesel will they use for the 794 km journey from Queenstown to their home in Blenheim?



Higher or lower game



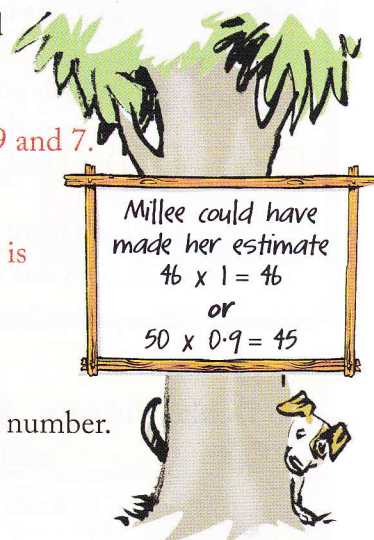
Die, cards numbered 0 to 9.



- 1 Take turns to roll the die.
The person with the largest number is the leader for the first round.
- 2 The leader picks out six cards and shows the numbers to the other players.
- 3 Without showing the other players, the leader makes up two decimal numbers using the chosen digits. Each number must have three digits.
- 4 The leader makes up a multiplication with his or her numbers and writes down, with working, an estimate of the answer.
- 5 The leader tells the group an estimate for the answer and the first digit of the larger number in the calculation.

Example

Millee is the leader and picks cards 0, 4, 5, 8, 9 and 7.
She chooses the calculation 45.9×0.87 .
She writes down $50 \times 1 = 50$.
She tells the group an estimate for the answer is 50 and that the larger number starts with 4.



- 6 The players take turns to guess the two numbers.
Give the higher number first.
The leader may only answer too high or too low for each number.
The leader writes the guesses in order on the board.

Example

Higher number

Sam guesses 48.9.

Millee says too high.

Record on board

48.9 too high

Mira guesses 45.7.

Millee says too low.

etc.

45.7 too low

Lower number

Sam guesses 0.75.

Millee says too low.
etc.

Record on board

0.75 too low

- 7 The person who guesses the second number has a chance to write down how Millee found her estimate.
If that person is correct he or she is the leader for the next round.
If that person does not get the estimate correct, the leader has another turn.

Variations:

- 1 Make a division rather than a multiplication.
- 2 The leader does not tell the other players the first digit of the larger number.